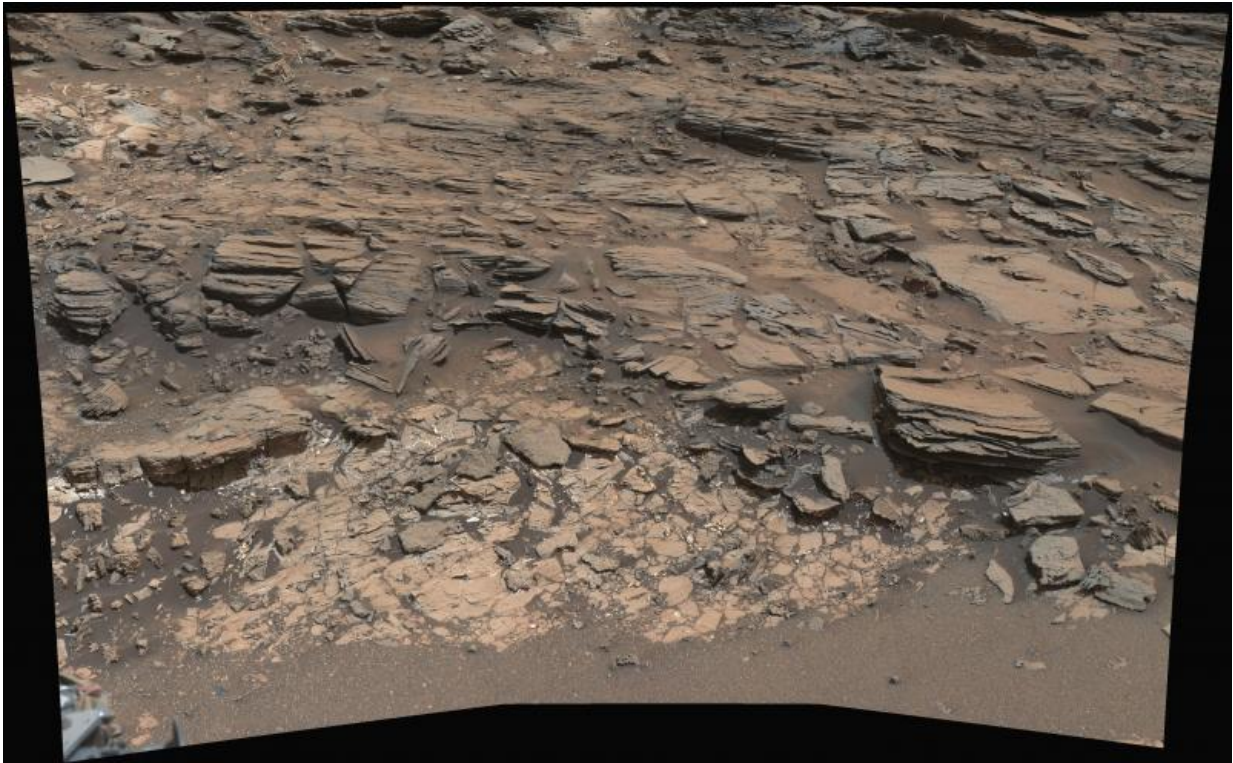


NASA's Curiosity Mars rover studies rock-layer contact zone

July 2 2015, by Guy Webster



This view from the Mast Camera (Mastcam) on NASA's Curiosity Mars rover shows a site where two different types of bedrock meet on lower Mount Sharp. The scene combines multiple images taken by the left-eye camera of Mastcam on May 25, 2015, during the 995th Martian day, or sol, of Curiosity's work on Mars, in a valley just below "Marias Pass." The color has been approximately white-balanced to resemble how the scene would appear under daytime lighting conditions on Earth. Credit: NASA/JPL-Caltech/MSSS

NASA's Curiosity Mars rover is examining a valley where at least two types of bedrock meet, for clues about changes in ancient environmental conditions recorded by the rock.

In addition to two rock types for which this site was chosen, the rover has found a sandstone with grains of differing shapes and color.

Curiosity's international team has resumed full operations of the car-size mobile laboratory after a period of limited activity during most of June. The operations moratorium for Curiosity and other spacecraft at Mars happens about every 26 months, when Mars passes nearly behind the sun from Earth's perspective, and the sun interferes with radio communication between the two planets.

At the rover's current location near "Marias Pass" on Mount Sharp, Curiosity has found a zone where different types of bedrock neighbor each other. One is pale mudstone, like bedrock the mission examined previously at "Pahrump Hills." Another is darker, finely bedded sandstone above the Pahrump-like mudstone. The rover team calls this sandstone the Stimson unit.

On Mars as on Earth, each layer of a sedimentary rock tells a story about the environment in which it was formed and modified. Contacts between adjacent layers hold particular interest as sites where changes in [environmental conditions](#) may be studied. Some contacts show smooth transitions; others are abrupt.

Curiosity climbed an incline of up to 21 degrees in late May to reach Marias Pass, guided by images from NASA's Mars Reconnaissance Orbiter showing Pahrump-like and Stimson outcrops close together.

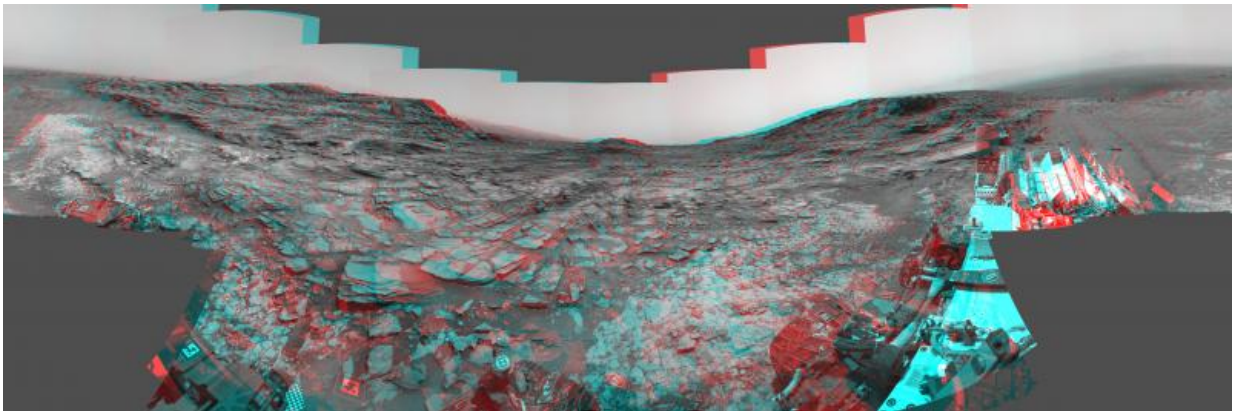


This view of a sandstone target called "Big Arm" covers an area about 1.3 inches (33 millimeters) wide in detail that shows differing shapes and colors of sand grains in the stone. Three separate images taken by the Mars Hand Lens Imager (MAHLI) camera on NASA's Curiosity Mars rover, at different focus settings, were combined into this focus-merge view. The Big Arm target on lower Mount Sharp is at a location near "Marias Pass" where a mudstone bedrock is in contact with overlying sandstone bedrock. MAHLI recorded the component images on May 29, 2015, during the 999th Martian day, or sol, of Curiosity's work on Mars. The rounded shape of some grains visible here suggests they traveled long distances before becoming part of the sediment that later hardened into sandstone. Other grains are more angular and may have originated closer to the rock's current location. Lighter and darker grains may have different compositions. Credit: NASA/JPL-Caltech/MSSS

"This site has exactly what we were looking for, and perhaps something extra," said Curiosity Project Scientist Ashwin Vasavada, of NASA's Jet Propulsion Laboratory, Pasadena, California. "Right at the contact between the Pahrump-like mudstone and the Stimson sandstone, there appears to be a thin band of coarser-grained rock that's different from either of them."

The in-between material is a sandstone that includes some larger grains, of mixed shapes and colors, compared to the overlying dark sandstone.

"The roundedness of some of the grains suggests they traveled long distances, but others are angular, perhaps meaning that they came from close by," Vasavada said. "Some grains are dark, others much lighter, which indicates that their composition varies. The grains are more diverse than in other sandstone we've examined with Curiosity."

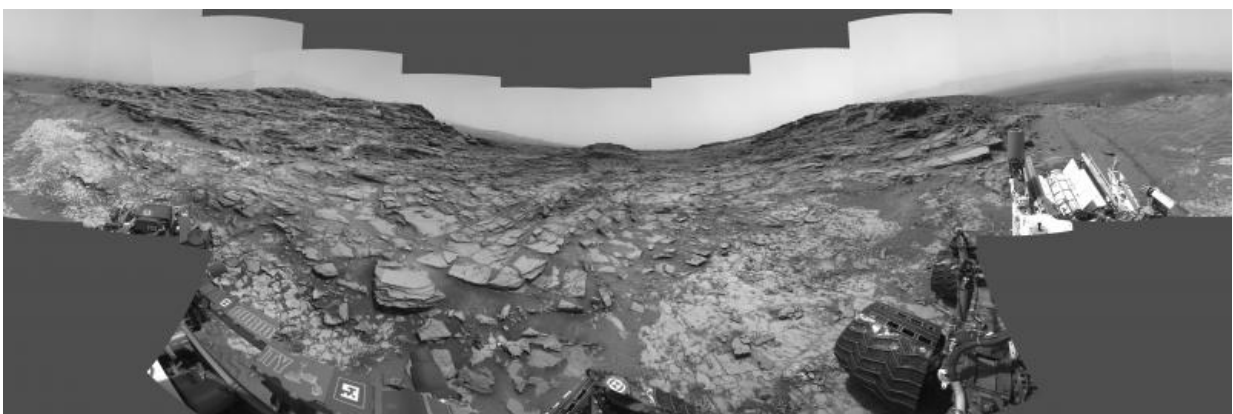


This stereo view from the Navigation Camera (Navcam) on NASA's Curiosity Mars rover shows a 360-degree panorama around the location where the rover spent its 1,000th Martian day, or sol, on Mars. The image appears three-dimensional when viewed through red-blue glasses with the red lens on the left. The center of the scene is toward the south, with north at both ends. This stereo view combines images from Navcam left-eye and right-eye cameras. Tracks from the rover's drive to this site are visible at right. The rover team chose this

location near Marias Pass because images from orbit showed what appeared to be a contact between two types of bedrock. The two types are evident in this panorama. The bedrock close to the rover is pale mudstone similar to what Curiosity examined in 2014 and early 2015 at "Pahrump Hills." The darker, finely bedded bedrock above it is sandstone that the rover team calls the "Stimson" unit. The largest-looking slab of Stimson sandstone in the image, in the lower left quadrant, is a target called "Ronan," selected for close-up inspection. Credit: NASA/JPL-Caltech

The science team has identified rock targets for further close-up inspection of the textures and composition of the mudstone and [sandstone](#) exposed near Marias Pass. The team anticipates keeping Curiosity busy at this site for several weeks before driving higher on Mount Sharp.

Curiosity has been exploring on Mars since 2012. It reached the base of Mount Sharp last year after fruitfully investigating outcrops closer to its landing site and then trekking to the mountain. The main mission objective now is to examine successively higher layers of Mount Sharp.



This 360-degree panorama from the Navigation Camera (Navcam) on NASA's

Curiosity Mars rover shows the surroundings of a site on lower Mount Sharp where the rover spent its 1,000th Martian day, or sol, on Mars. Credit: NASA/JPL-Caltech

Provided by Jet Propulsion Laboratory

Citation: NASA's Curiosity Mars rover studies rock-layer contact zone (2015, July 2) retrieved 19 April 2024 from <https://phys.org/news/2015-07-nasa-curiosity-mars-rover-rock-layer.html>

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